

VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO)
MINIATURE SIZE LOW PROFILE, WIDE PULL RANGE

VG - 4231CE

- Frequency range : 24 MHz to 36 MHz
- Supply voltage : 3.3 V (PSCM / CSCM)
 : 2.8 V (PSBM / CSBM)
 : 1.8 V (PQEM / CQEM)
- Frequency control range : $\pm 140 \times 10^{-6}$ (*SCM / *SBM)
 : $\pm 120 \times 10^{-6}$ (*QEM)
- Low current consumption : 1.3 mA Typ. (27 MHz)
- Thickness : 1.05 mm Typ.



Actual size



Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		PSCM / CSCM	PSBM / CSBM	PQEM / CQEM	
Output frequency range	f_0	24 MHz to 36 MHz		24 MHz to 30 MHz	Please contact us for inquiries regarding other frequencies.
Supply voltage	V _{cc}	3.3 V ± 0.3 V	2.8 V ± 0.2 V	1.8 V ± 0.2 V	
Temperature range	Storage temperature	-40 °C to +125 °C			Store as bare product after unpacking
	Operating temperature	As per below table			
Frequency tolerance	F _{tol(osc)}	As per below table			C : V _c =1.65 V / B : V _c =1.40 V / E : V _c =0.90 V
Current consumption	I _{cc}	3.5 mA Max.		1.2 mA Max.	No load condition
Frequency control range	F _{cont}	S: $\pm 140 \times 10^{-6}$		Q: $\pm 120 \times 10^{-6}$	V _c = 50 % V _{cc} \pm 50 % V _{cc}
Modulation characteristics	BW	15 kHz Min.			± 3 dB (at 1kHz)
Input resistance	R _{in}	M : 1 M Ω Min.			DC level
Frequency change polarity	—	Positive polarity			V _c =0 V to V _{cc}
Symmetry	SYM	40 % to 60 %			CMOS load:50 % V _{cc} level
High output voltage	V _{OH}	V _{cc} -0.4 V Min.			I _{OH} =-3.0 mA
Low output voltage	V _{OL}	0.4 V Max.			I _{OL} = 3.0 mA
Output load condition (CMOS)	L _{CMOS}	15 pF Max.			CMOS load
Output rise and fall time	t _r / t _f	4 ns Max.		8 ns Max.	CMOS load: 20 % V _{cc} to 80 % V _{cc} level
Oscillation start up time	t _{osc}	5 ms Max.			Time at 90 % V _{cc} to be 0 s
Frequency aging	F _{aging}	$\pm 5 \times 10^{-6}$ Max.			+25 °C, 5 years

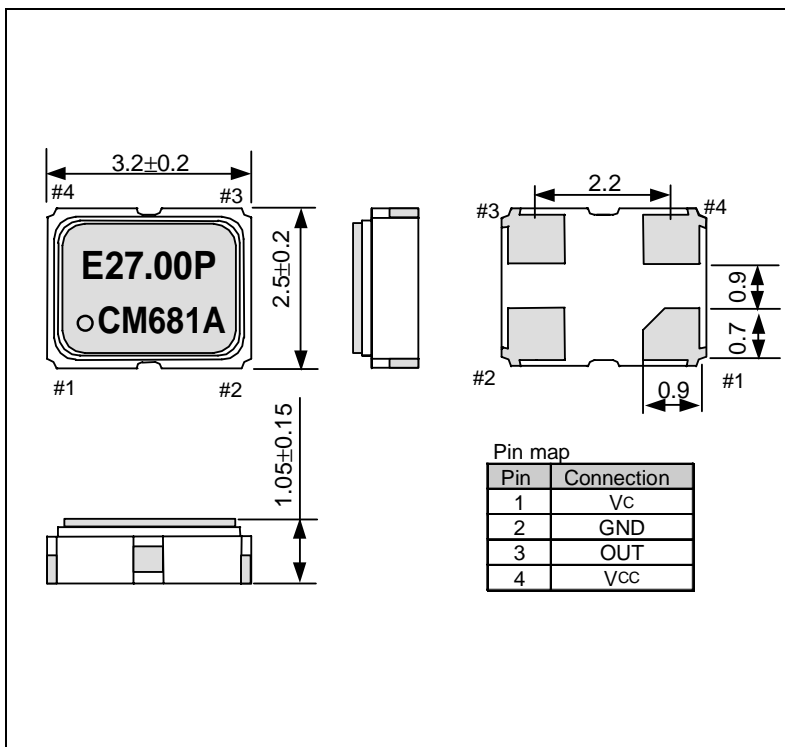
* Please keep V_c pin open or ground while powering up V_{cc}.

Frequency tolerance / Temperature range / Absolute pull range

	Frequency tolerance	Temperature range	Absolute pull range
CSCM / CSBM / CQEM	$\pm 30 \times 10^{-6}$	-20 °C to +70 °C	S : $\pm 100 \times 10^{-6}$ / Q : $\pm 80 \times 10^{-6}$
PSCM / PSBM / PQEM	$\pm 37 \times 10^{-6}$	-40 °C to +85 °C	S : $\pm 95 \times 10^{-6}$ / Q : $\pm 75 \times 10^{-6}$

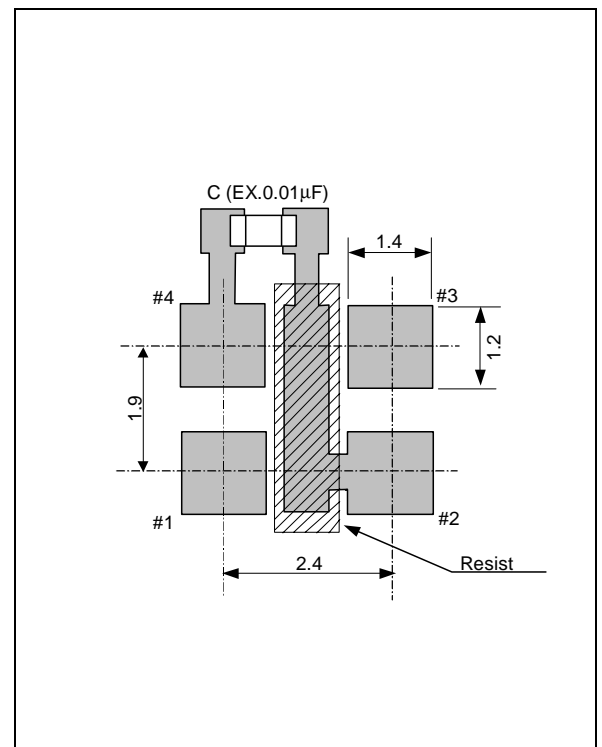
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



“3D STRATEGY” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, all environmental initiatives operate under the Plan-Do-Check-Action(PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard. All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification. In the future, new group companies will be expected to acquire the certification around the third year of operations.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

WORKING FOR HIGH QUALITY

Epson Toyocom quickly began working to acquire company-wide ISO 9000 series certification, and has acquired ISO 9001 or ISO 9002 certification for all targeted products manufactured in Japanese and overseas plants.

Epson Toyocom has acquired QS-9000 certification, which is of a higher level. Also, TS 16949 certification, which is also of a higher level, has been acquired.

QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

Notice

- This material is subject to change without notice.
- Any part of this material may not be reproduced or duplicated in any form or any means without the written permission of Epson Toyocom.
- The information, applied circuitry, programming, usage, etc., written in this material is intended for reference only. Epson Toyocom does not assume any liability for the occurrence of infringing on any patent or copyright of a third party. This material does not authorize the licensing on for any patent or intellectual copyrights.
- Any product described in this material may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of International Trade and Industry or other approval from another government agency.
- These products are intended for general use in electronic equipment. When using them in specific applications that require extremely high reliability, such as the applications stated below, you must obtain permission from Epson Toyocom in advance.
 - / Space equipment (artificial satellites, rockets, etc.) / Transportation vehicles and related (automobiles, aircraft, trains, vessels, etc.)
 - / Medical instruments to sustain life / Submarine transmitters / Power stations and related / Fire work equipment and security equipment
 - / traffic control equipment / and others requiring equivalent reliability.
- In this new crystal master for Epson Toyocom, product codes and markings will remain as previously identified prior to the merger. Due to the on-going strategy of gradual unification of part numbers, please review product codes and markings, as they will change during the course of the coming months. We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom that will be user friendly.